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November 15, 2013

Dania Zinner
USEPA; Region 8
1595 Wynkoop Street (8EPR-SR)
Denver, CO 80202-1129

Document ID #: 3019-11152013-5

Dear Ms. Zinner:

EPA CONTRACT NUMBER EP-W-10-033
TASK ORDER NUMBER 3019
QA SUPPORT FOR THE LIBBY ASBESTOS SITE

Enclosed please find the Summary Asbestos On-site Audit Report for the on-site audit performed on August 28, 2013 at Hygeia Laboratories, Inc. in Sierra Madre, California. This report and the accompanying checklist are deliverables under Task 5 of the subject Task Order.

If you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in dark ink, reading 'Timothy Vonnahme'. The signature is fluid and cursive, with the first name 'Timothy' and last name 'Vonnahme' clearly legible.

Timothy L. Vonnahme
Audit Group Manager, QATS Program
CB&I Federal Services, LLC
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E-Mail Address: timothy.vonnahme@cbifederalservices.com

cc: Administrative Contracting Officer (letter only)
Audit Group Files



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The QATS Program's Quality Management System is certified to the ISO 9001:2008 International Standard

REPORT
FOR
TASK ORDER NUMBER 2019
QUALITY ASSURANCE SUPPORT FOR THE LIBBY ASBESTOS SITE
SUMMARY ASBESTOS ON-SITE AUDIT REPORT

Hygeia Laboratories, Inc. (Sierra Madre, California)

Prepared by:

**The Data Auditing Group
Quality Assurance Technical Support Program
CB&I Federal Services, LLC
2700 Chandler Avenue
Las Vegas, Nevada 89120**

November 14, 2013

QATS Contract Number: EP-W-10-033

Prepared for:

**Dania Zinner
Task Order Manager**

**Region 8
U.S. Environmental Protection Agency
1595 Wynkoop Street
Denver, CO 80202**

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ATTACHMENT

Libby-Specific Asbestos Laboratory On-site Audit Checklist (EPA Only)

LABORATORY INFORMATION AND AUDIT SCOPE

This report summarizes the results of an asbestos on-site laboratory audit of Hygeia Laboratories, Inc. in Sierra Madre, California performed on August 28, 2013. The audit was conducted in support of the United States Environmental Protection Agency (EPA) Region 8 Libby Superfund Site activities. The purpose of the audit was to evaluate corrective actions taken by the laboratory to address deficiencies identified from the last on-site audit conducted on July 25-26, 2013. CB&I Federal Services, LLC Quality Assurance Technical Support (QATS) staff participation in the on-site audit and subsequent preparation of this report was performed under Task 5, Task Order 2019, QATS Contract EP-W-10-033.

Detailed information regarding the subject laboratory is as follows:

Date of On-site:	August 28, 2013
Laboratory:	Hygeia Laboratories, Inc. 82 West Sierra Madre Boulevard Sierra Madre, CA 91024 (626) 355-4497
QA Officer:	Kyeong Corbin
Audit Team	
US EPA:	Dania Zinner (by teleconference)
CB&I QATS:	Michael Lenkauskas, CQA, Senior Auditor

The Audit Team, comprised of CB&I Federal Services, LLC QATS personnel, performed the technical and evidentiary aspects of the on-site audit. Due to unforeseen circumstances, a representative of the EPA was not able to attend but participated in the debriefing via conference call. The technical and evidentiary parts of the audit involved an evaluation of corrective actions taken by the laboratory to address the deficiencies identified during the previous on-site audit conducted on July 25-26, 2012.

The processes evaluated included sample receipt, sample storage, sample tracking, direct and indirect sample preparation for Transmission Electron Microscopy (TEM) analysis, analysis by TEM, analysis by Polarized Light Microscopy (PLM), and Quality Assurance/Quality Control (QA/QC). All pertinent laboratory instrumentation and equipment were inspected for proper maintenance and calibration, and laboratory personnel were interviewed to determine their understanding and adherence to laboratory procedures.

During the course of the audit, the applicable sections of the Libby-Specific Asbestos Laboratory On-site Audit Checklist were completed by the Audit Team. Sections of the checklist not completed during the audit are indicated with an "NA." The checklist is provided as an attachment to this report (EPA only).

EXECUTIVE SUMMARY

An asbestos on-site audit of Hygeia Laboratories, Inc. in Sierra Madre, California was performed on August 28, 2013 in support of EPA Region 8 Libby Superfund Site activities. The primary focus of the audit was to evaluate the corrective actions taken by the laboratory to address the deficiencies identified during the previous on-site audit conducted on July 25-26, 2012. The laboratory areas and processes evaluated include sample receipt, sample storage, sample tracking, direct and indirect sample preparation for Transmission Electron Microscopy (TEM) analysis, analysis by TEM, analysis by Polarized Light Microscopy (PLM), and Quality Assurance/Quality Control (QA/QC).

The corrective actions applied by the laboratory to the 10 deficiencies identified in the July 2012 on-site audit were evaluated during the current on-site audit. The Audit Team determined that the laboratory had completely addressed all six deficiencies, for a corrective action rate of 100%.

The on-site audit identified two new deficiencies which are summarized below by laboratory area:

Polarized Light Microscopy (PLM) Analysis – Two deficiencies were assessed for performing Laboratory Duplicate Cross-check (LDC) analyses on newly-prepared slides, rather than on the original slide mounts, and for failure to include all Libby Amphiboles (LAs), present as prismatic structures, in the amount of LA present in soil samples analyzed by the project-specific PLM-VE procedure.

With the exception of the deficiencies noted above, the on-site evaluation revealed that Hygeia Laboratories, Inc. to have sufficient facilities, equipment, and staff to analyze samples in accordance with the specified methodologies and Libby-specific protocol. All staff and management were cooperative, readily answered all questions asked by the Audit Team, and appeared to be responsive to the identified deficiencies.

AUDIT FINDINGS

Sample Receipt, Storage, Log-in, and Chain-of-Custody (COC)

The evaluation of this area focused on the one deficiency identified in the previous on-site audit, which was found to have been adequately addressed. No additional deficiencies were observed.

Indirect and Direct Preparation of Air Filter and Dust Samples

The evaluation of this area focused on the four (4) deficiencies identified in the previous on-site audit, all of which were found to have been adequately addressed. No additional deficiencies were observed.

Transmission Electron Microscopy (TEM) Analysis

The evaluation of this area focused on the one deficiency identified in the previous on-site audit, which was found to have been adequately addressed. No additional deficiencies observed.

Polarized Light Microscopy (PLM) Analysis

The evaluation of this area focused on two deficiencies identified in the previous audit, both of which have been addressed as described in the section "Corrective Action Applied from the Previous Audit Deficiencies" on Page 6 of this report. Two new deficiencies were identified:

1. Laboratory Duplicate Cross-check (LDC) analyses are not currently performed as described in the project-specific PLM-VE SOP. The LDC analyses are performed on newly prepared slides, and not on the slides that were prepared by the original analyst for the original analysis. The requirement that LDC analyses be performed on the five required original slide preparations is described in Section 16.4.4 of the SOP for the Analysis of Asbestos Fibers in Fine Soil by PLM (SRC-Libby-03, Rev. 3). (Checklist Nos. 8.13.1.2 and 8.14.1)

Recommended Corrective Action – Ensure that LDC analyses are performed on the five original slide mounts prepared by the original analyst for the original analysis.

2. Libby Amphiboles (LAs) present as prismatic structures are not currently included in the assessment of the amount of LA present in soil samples analyzed by the project-specific PLM-VE procedure. The requirement that all Winchite, Richterite, Tremolite, Actinolite, Magnesio-arfvedsonite, and Magnesio-riebeckite observed in a sample be recorded as LA, regardless of habit observed (i.e., fibrous, straight, or prismatic), is described in Section 16.4.4 of the SOP for the Analysis of Asbestos Fibers in Fine Soil by PLM (SRC-Libby-03, Rev. 3). (Checklist Nos. 8.11.5.2.1, 8.11.6.2, and 8.14.1)

Recommended Corrective Action – Ensure that all Winchite, Richterite, Tremolite, Actinolite, Magnesio-arfvedsonite, and Magnesio-riebeckite observed in a sample be recorded as LA, regardless of habit observed.

Data Management

This area was not evaluated since there were no data management issues identified in the previous audit.

Quality Control and Quality Assurance (QA/QC)

The evaluation of this area focused on the two deficiencies identified in the previous on-site audit, both of which were found to have been adequately addressed. No additional deficiencies were observed.

CORRECTIVE ACTION APPLIED FROM THE PREVIOUS AUDIT FINDINGS

The on-site laboratory evaluation included an assessment of the ten deficiencies identified and reported in the previous on-site audit performed on July 25-26, 2012. The Audit Team determined that the laboratory had completely addressed all ten deficiencies (100.0%). The following are the deficiencies identified during the previous on-site audit, the laboratory's verbatim responses to the audit comments, and effectiveness checks performed during the current on-site audit.

Sample Receipt, Storage, Log-in, and Chain-of-Custody (COC)

1. An excerpt from an obsolete revision of the laboratory's QAM was present in the sample receiving area. A printed copy of Section 3.0, which describes the laboratory's sample receipt and login procedures from the QAM dated June 2007, was in the sample receiving area. The most recent revision of the laboratory's QAM is dated February 2011. The requirement that all quality management system documents be readily available where needed and obsolete documents promptly be removed is described in Section 8.1 of the laboratory's QAM. (Checklist No. 4.6.1)

Note: *The described excerpt was removed prior to the on-site audit debriefing on July 26, 2012.*

Recommended Corrective Action – Although the obsolete document was removed from circulation, additional obsolete documents were identified in other areas of the laboratory, indicating this was not an isolated incident, but a symptom of the more general observation described in Finding No. 10 of this report.

Laboratory Response (10/02/2012): *Please see item 10.*

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

Indirect and Direct Preparation of Air Filter and Dust Samples

2. The project-specific SOP for indirect preparation of air and dust samples (EPA-Libby-08) present in the TEM sample preparation area was not the most recent revision available in the CDM eRoom. The SOP available in the TEM sample preparation area is dated November 2006. The most recent SOP available in the CDM eRoom is dated January 2007. The requirement that all quality management system documents be readily available where needed and obsolete documents promptly be removed is described in Section 8.1 of the laboratory's QAM. (Checklist No. 6.5.2.2)

Note: *The SOP revision dated November 2006 was replaced with the revision dated January 2007 prior to the on-site audit debriefing on July 26, 2012.*

Recommended Corrective Action – Although the obsolete document was removed from circulation, additional obsolete documents were identified in other areas of the laboratory, indicating this was not an isolated incident, but a symptom of the more general observation described in Finding No. 10 of this report.

Laboratory Response (10/02/2012): Please see item 10.

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

3. The daily calibration of the analytical balance used to measure the initial weight of duff samples is not recorded in a balance-specific logbook. The daily calibrations performed on the Salter balance (Model No. 6055, Serial No. 2061228) from 06/12/2012 through 07/20/2012 are recorded on scrap paper and not in a controlled instrument-specific logbook. (Checklist Nos. 6.4.4.1 and 8.4.4.2)

Note: A pre-printed laboratory Analytical Balance Calibration logbook was created and used prior to the on-site audit debriefing on July 26, 2012.

Recommended Corrective Action – Ensure that all instrument calibration records are maintained in a permanent, traceable manner.

Laboratory Response (10/02/2012): The analyst underwent a refresher training meeting to properly maintain all instrument calibration records. A copy of meeting attendance is included. (Attachment 1)

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

4. The Effective Filtration Area (EFA) of the disposable filter assemblies used during indirect preparation are not determined for each lot of filters received but was assumed by the laboratory to be consistent. The requirement that supplies be checked for accuracy upon receipt is described in Section 5.4 of the laboratory's QAM. (Checklist No. 6.4.7.2)

Recommended Corrective Action – Ensure that the EFA of disposable and reusable filtration assemblies are determined and that the EFA of disposable filter assemblies are determined for each lot received.

Laboratory Response (10/02/2012): The laboratory reevaluated the EFA of reusable filtration assemblies. A new batch of filtration assemblies recommended by the assessor was ordered and the EFA was measured for the lot received. The measurement record is included. (Attachment 2)

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

5. The fume hood in the TEM sample preparation area sits on a bench top and does not have a brim or other hardware to prevent release of solvents, acids, or other spilled liquids. The requirement to provide the necessary equipment to handle the chemicals used by laboratory personnel is described in Section 17.1 of the laboratory's QAM. (Checklist No. 6.3)

Recommended Corrective Action – Ensure that all fume hoods and other containment equipment is equipped with the necessary hardware to minimize the potential for release of toxic liquids and/or fumes.

Laboratory Response (10/02/2012): A brim was installed on the fume hood in the TEM sample preparation area and the sides of the fume hood were sealed to prevent release of solvents, acids, or other spilled liquids as suggested.

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

Transmission Electron Microscopy (TEM) Analysis

6. An updated set of project-specific laboratory modifications was not available at the time of the evaluation. The requirement that all supporting documents be readily available where needed and that obsolete documents be promptly removed is described in Section 8.1 of the laboratory's QAM. (Checklist No. 7.3.2.1).

Note: A current set of project-specific laboratory modifications was printed and made available to applicable laboratory staff prior to the on-site audit debriefing on July 26, 2012.

Recommended Corrective Action – Although the obsolete documents were removed from circulation, additional obsolete documents were identified in other areas of the laboratory indicating this was not an isolated incident, but a symptom of the more general observation described in Finding No. 10 of this report.

Laboratory Response (10/02/2012): Please see item 10.

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

Polarized Light Microscopy (PLM) Analysis

7. Potential asbestos containing materials (ACMs) are handled outside of the fume (HEPA) hood during the PLM-Gravimetric procedure. The petri dish in which samples are weighed was not covered when transferred to the balance, which is located outside of the HEPA hood. The requirements for the safe handling of ACMs are described in Section 17.2 of the laboratory's QAM. (Checklist No. 8.12.2)

Recommended Corrective Action – Ensure that all ACMs are handled within a fume hood and covered when removed for weighing and other activities.

Laboratory Response (10/02/2012): The analysts underwent a refresher training meeting to properly handle ACM. A copy of meeting attendance is included. (Attachment 1)

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

8. The Laboratory Duplicate Cross-check (LDC) analytical observations (i.e., optical properties) are currently recorded on the same bench sheet as the observations of the original (first) analysis and are, therefore, not "blind." The requirement that PLM intra-analyst analyses and LDCs remain blind to the Quality Control (QC) analyst is described in Section 8.2 of the laboratory's QAM. (Checklist No. 8.13.1.2)

Recommended Corrective Action – Ensure that LDC results are recorded on a separate bench sheet other than that used to record the original results and that the results from the original (first) analyses are not known to the individual performing the second QC analysis.

Laboratory Response (10/02/2012): *The LDC results are recorded on a separate bench sheet now. The latest QC analysis bench sheet is enclosed. (Attachment 3)*

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

Data Management

No deficiencies concerning data management were identified.

Quality Control and Quality Assurance

9. Air monitoring in the analytical laboratories is not always performed at the frequencies described in the laboratory's written procedures. Although quarterly monitoring is described in both the TEM and PLM technical manuals, samples have only been collected in the specified TEM areas five times since October 2010 and four times in the PLM areas since August 2008. The requirements for quarterly air monitoring in the TEM and PLM areas are described in Sections 9.1 and 8.1 of the TEM Technical Manual and PLM Technical Manual, respectively. (Checklist No. 10.6.2)

Note: *Although the available data suggested air monitoring samples had not been collected in the PLM area from November 2009 through February 2012, Hygeia Management indicated some monitoring had been performed, but the supporting data had been misplaced.*

Recommended Corrective Action – Ensure that air monitoring is performed as described in the laboratory's written procedures or project-specific requirements (i.e., LB-000085A), whichever is more frequent.

Laboratory Response (10/02/2012): *The analysts underwent a refresher training meeting to review the QAM requirements for air and wipe monitoring and the LB-000085A requirements for air monitoring. (Attachment 1)*

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

10. Although the document control deficiencies described above in Findings 1, 2 and 6 were corrected prior to the laboratory debriefing on July 26, 2012, the presence of obsolete documents in several laboratory areas indicates that these may not be isolated incidents but may reflect a more systemic document control issue. The requirement that all management system and supporting documents be readily available where needed and that obsolete documents be promptly removed is described in Section 8.1 of the laboratory's QAM. (Checklist Nos. 4.6.1, 6.5.2.2, and 7.3.2.1)

Recommended Corrective Action – Ensure that the document control procedures described in the laboratory's QAM are properly implemented throughout the laboratory.

Laboratory Response (10/02/2012): *The laboratory decided to remove all paper trails and utilize quality documents electronically. All paper documents were removed from the work area and the latest QAM (quality manual), TM (technical manual), SOPs*

(standard operating procedures) and project-specific SOPs (e.g. Lab Mods, EPA-Libby-08, etc.) were placed on the server under a folder called Quality Documents. It is the QAO's responsibility (for QAM and TMs) and each Laboratory Supervisor's (for SOPs and project-specific documents) to maintain the latest version on the server (i.e. upload the latest version and remove the older version). All personnel went over the new document control procedure. (Attachment 1)

Effectiveness Check (08/28/2013): This deficiency has been completely addressed.

CONCLUSIONS

An asbestos laboratory on-site audit of Hygeia Laboratories, Inc. in Sierra Madre, California was performed on August 28, 2013 in support of EPA Region 8 Libby Superfund Site activities. The primary focus of the audit involved an evaluation of corrective actions taken by the laboratory to address the deficiencies identified during the previous on-site audit conducted on July 25-26, 2012. The laboratory areas and process evaluated include sample receipt, sample storage, sample tracking, direct and indirect sample preparation for Transmission Electron Microscopy (TEM) analysis, analysis by TEM, analysis by Polarized Light Microscopy (PLM), and Quality Assurance/Quality Control (QA/QC).

The Audit Team evaluated the corrective action applied to the 10 deficiencies identified in the previous on-site audit and determined that the laboratory completely addressed all 10 deficiencies, for a corrective action rate of 100%.

The on-site audit identified the following two new deficiencies:

- Laboratory Duplicate Cross-check (LDC) analyses are not currently performed as described in the project-specific PLM-VE SOP.
- Libby Amphiboles (LAs), present as prismatic structures, are not currently included in the amount of LA present in soil samples analyzed by the project-specific PLM-VE procedure.

With the exception of the two (2) deficiencies noted above and in the report, the on-site evaluation revealed Hygeia Laboratories, Inc. to have sufficient facilities, equipment, and staff to analyze samples in accordance with the specified methodologies and Libby-specific protocol. All staff and management were cooperative, readily answered all questions asked by the Audit Team, and appeared to be responsive to the identified deficiencies.

ATTACHMENT

Libby-Specific Asbestos Laboratory On-site Audit Checklist (EPA Only)

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 08/28/2013Laboratory: Hygeia Laboratories, Inc.Address: 82 West Sierra BoulevardSierra Madre, CA 91024Telephone: (626) 355-4497Laboratory Personnel Contacted

Name	Title
Arturo Casas	Laboratory Manager/PLM Supervisor
Kyeong Corbin	QAO/TEM Supervisor

Evaluation Team

Name	Title
Michael Lenkauskas, CQA	CB&I Federal Services, LLC (QATS), Senior Auditor

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 08/28/2013

1.0 LABORATORY STATUS & CAPABILITIES		Yes	No	Comments
1.1 Which of the following capabilities does the laboratory possess:				
1.1.1	Phase Contrast Microscopy (PCM)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1.1.2	Polarized Light Microscopy (PLM)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1.1.3	Transmission Electron Microscopy (TEM)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
1.1.4	Others (list)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
1.2 Is the laboratory currently receiving samples from Libby Superfund Site Operable Units?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have been receiving samples from Libby since 2002.
If "YES," complete the following table:				
Operable Unit	Matrix/Method(s)	Project/Comments		
All	ABS/ ISO 10312			
OU3	Water/ISO 10312	None in 2012		
All	Soil/PLM-VE & Grav			
OU4	Ambient air & Duff/ISO 10312			

2.0 LABORATORY SECURITY		Yes	No	Comments
2.1 Are visitors required to sign in?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2.2 Are all entrances to the laboratory secured?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:				

3.0 PROJECT INITIATION/PROJECT MANAGEMENT		Yes	No	Comments
3.1 Are there designated project managers or a project management team to ensure samples received are properly processed?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Kyeong Corbin
3.2 Are project-specific requirements and procedures communicated to laboratory staff:				
3.2.1	Project-specific SOPs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Available in the eRoom where all applicable Hygeia personnel have access.
3.2.2	Laboratory Modifications?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3.2.3	SAP Analytical Summaries?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3.2.4	Project-specific Electronic Data Deliverables (EDDs)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3.2.5	Other (list)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Additional Comments:				

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 08/28/2013

4.0 SAMPLE RECEIPT, LOG-IN, STORAGE, & TRACKING		Yes	No	Comments
4.1 Is the sample receiving area adequate, clean, and orderly?		NA	NA	
Personnel Interviewed				
Name	Title	Experience		
4.2 Sample Receipt				
4.2.1 Is there a sample custodian and designated alternate responsible for sample receipt and log-in?		NA	NA	
4.2.2 Is the custodian or alternate available to receive and log-in samples at any time delivery services are operating?		NA	NA	
4.2.3 Are sample shipping containers opened in a HEPA hood (as necessary) to both minimize personal exposure and safeguard against laboratory contamination?		NA	NA	
4.2.4 Does the sample custodian verify and record the following when inspecting shipments and reviewing documentation:				
4.2.4.1 Presence and condition of custody seals?		NA	NA	
4.2.4.2 Presence or absence of Chain-of-Custody (COC) records?		NA	NA	
4.2.4.3 Presence or absence of air bill sticker(s)?		NA	NA	
4.2.4.4 Sample condition?		NA	NA	
4.2.4.5 Presence of packaging or packing material which could compromise samples (i.e., vermiculite & polystyrene)?		NA	NA	
4.2.4.6 Problems/discrepancies between samples, documentation, client requests, etc.?		NA	NA	
4.2.4.7 Bulk and air samples received separately?		NA	NA	
4.2.5 Are COC records signed and dated at the time of sample receipt?		NA	NA	
4.2.6 Is a system in place to ensure laboratory personnel are made aware of project specific requirements?		NA	NA	
4.2.7 Is a system in place to contact the client in case of absent documentation, or discrepancies between COCs, client requests, etc.?		NA	NA	
4.2.8 Are subsequent resolutions to problems and discrepancies documented?		NA	NA	
4.3 Sample Identification				
4.3.1 Are sample receipt identification logbooks, or a LIMS, used to log-in samples and assign unique laboratory identification numbers?		NA	NA	
4.3.1.1 Does the logbook or logging system serve as a direct cross-reference between laboratory ID numbers and client ID numbers?		NA	NA	
Additional Comments:				

Date(s) of On-site: 08/28/2013QATS Form 70-050F075R01, 05-17-2012

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 08/28/2013

5.0 PHASE CONTRAST MICROSCOPY (PCM)		Yes	No	Comments
5.1 Does the laboratory perform PCM analyses on samples received from the Libby Superfund site?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>If answered "No" precede to Section 6.0 of the checklist.</i>				
5.2 Is the PCM area adequate, clean, and orderly?		<input type="checkbox"/>	<input type="checkbox"/>	
5.3 Are steps taken to prevent the cross-contamination of equipment, supplies, and reagents?		<input type="checkbox"/>	<input type="checkbox"/>	
Personnel Interviewed				
Name		Title		Experience
5.4 Methods and Guidance Documents		Yes	No	Comments
5.4.1 Are the applicable guidance documents available for reference:				
5.4.1.1 NIOSH Method 7400 (Issue 2), 1994?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.1.2 Other (list)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2 Are project-specific requirements communicated to laboratory personnel and available for reference:				
5.4.2.1 Laboratory Modification LB-000015A?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2.2 SOP EPA-Libby-08?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2.3 SAP Analytical Summaries?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2.4 Project-specific Electronic Data Deliverables (EDDs)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2.5 Other (list)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5 Equipment				
5.5.1 Ventilation Hoods:				
5.5.1.1 Checked routinely and recorded in a permanent logbook?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2 Are the microscopes used to analyze samples equipped with the following:				
5.5.2.1 Positive phase contrast, with green or blue filter?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.2 Adjustable field iris?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.3 Eyepiece (8 to 10X)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.4 Phase magnification (40 to 45X)?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.5 Walton-Beckett Graticule?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.2.6 Stage micrometer with 0.01 mm subdivisions?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.3 Are microscope and phase ring alignment checks conducted daily?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.4 Is resolution periodically checked using an HSE/NPL slide?		<input type="checkbox"/>	<input type="checkbox"/>	
5.5.5 Are maintenance and calibration activities recorded in microscope-specific logbooks?		<input type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:				

LIBBY-SPECIFIC ASBESTOS LABORATORY ON-SITE AUDIT CHECKLIST

USEPA

Date(s) of On-site: 08/28/2013

5.0 PHASE CONTRAST MICROSCOPY (PCM)		Yes	No	Comments
5.6 Sample Preparation				
5.6.1	Are filters prepared as described in the applicable method(s)?	<input type="checkbox"/>	<input type="checkbox"/>	
5.6.2	Are filters visibly overloaded (>25%) or contain loose debris prepared indirectly as described in SOP EPA-Libby-08?	<input type="checkbox"/>	<input type="checkbox"/>	
5.7 Sample Analysis				
5.7.1	Are the appropriate counting rules used (A or B)?	<input type="checkbox"/>	<input type="checkbox"/>	
5.7.2	How are the fields and fibers tracked and recorded? _____			
5.8 Quality Control				
5.8.1	Is each analyst provided a minimum of one reference slide per work day?	<input type="checkbox"/>	<input type="checkbox"/>	
5.8.2	Are recounts analyzed at a frequency of 1 per 10 samples analyzed?	<input type="checkbox"/>	<input type="checkbox"/>	
5.8.2.1	For count pairs not within acceptance limits are associated samples recounted?	<input type="checkbox"/>	<input type="checkbox"/>	
5.9 Standard Operating Procedures (SOPs)				
5.9.1	Are the applicable laboratory SOPs available and followed by laboratory personnel (list)?	<input type="checkbox"/>	<input type="checkbox"/>	
Document Title		Control No.		Description
5.10 Document Control		Yes	No	Comments
5.10.1	Are all logbooks, notebooks, forms, or other laboratory documents legible, accurate, and complete (list)?	<input type="checkbox"/>	<input type="checkbox"/>	
Document Title		Description/Comments		
Additional Comments:				

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.1 Are the grid preparation areas adequate, clean, and orderly?	NA	NA	
6.2 Are bulk samples prepared in an area separate from that used to prepare air and dust samples?	NA	NA	
6.3 Are steps taken to prevent the cross-contamination of equipment, supplies, and reagents?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Personnel Interviewed			
Name	Title		Experience
Kyeong Corbin	QAO/TEM Supervisor		30+ Years
6.4 Equipment & Supplies	Yes	No	Comments
6.4.1 Ventilation Hoods:			
6.4.1.1 Checked routinely and recorded in a permanent logbook?	NA	NA	
6.4.2 Drying oven:			
6.4.2.1 Checked routinely and recorded in a permanent logbook?	NA	NA	
<i>Note: Desiccator is an option for indirect preparation.</i>			
6.4.3 Muffle furnace:			
6.4.3.1 Checked routinely and recorded in a permanent logbook?	NA	NA	
6.4.4 Analytical balances:			
6.4.4.1 Checked routinely and recorded in a permanent logbook?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.4.4.2 Calibrated within the last 12 months by a certified technician?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.4.5 Plasma Asher:			
6.4.5.1 Calibrated at least quarterly and recorded in a permanent logbook?	NA	NA	Calibrated monthly to 10%.
<i>Refer to Request for Modification LB-000085A</i>			
6.4.6 Sputter Coater (Vacuum evaporator):			
6.4.6.1 Checked routinely and recorded in a permanent logbook?	NA	NA	
6.4.7 Filtration Apparatus (for indirect preparation):			
6.4.7.1 Are disposable or glass funnels used (record catalogue #)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	25mm Environmental Express (catalogue #F1500).
6.4.7.2 Has the Effective Filtration Area (EFA) been determined and recorded for each apparatus?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Average of 5 measurements.
6.4.8 TEM Grids:			
6.4.8.1 Is documentation for average grid opening determination available?	NA	NA	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.5 Direct and Indirect Preparation Methodology			
6.5.1 What method(s) does the laboratory use to prepare air and dust samples for TEM analysis:			
6.5.1.1 40 CFR, Chapter 1, Part 763, Subpart E - AHERA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.1.2 ISO 10312:1195 E - Determination of Asbestos Fibers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.1.3 ASTM D 5755-09 - Micro vacuum Sampling and Indirect Analysis of Dust by TEM?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.1.4 Others (list)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6.5.2 Are project-specific requirements communicated to laboratory personnel and available for reference:			
6.5.2.1 Laboratory Modifications?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.2.2 Project-specific SOPs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.2.3 SAP Analytical Summaries?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6.5.2.4 Other (list)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Available in the eRoom where all applicable Hygeia personnel have access.
6.6 Sample Inspection			
6.6.1 Are air filter cassettes carefully wet-wiped prior to being transferred to the clean preparation area for inspection?	NA	NA	
6.6.2 Are air filter samples which are visibly overloaded, exhibit uneven loading, or contain loose debris, prepared indirectly? <i>Refer to Laboratory Modifications LB-000016H & LB-000031G</i>	NA	NA	
6.6.3 Are all ambient air samples dried upon receipt at the on-site laboratory (i.e., EMSL-Libby) prior to preparation and analysis? <i>Refer to Laboratory Modification LB-000055A</i>	NA	NA	
6.7 Direct Preparation of MCE and Polycarbonate Filters			
6.7.1 Are MCE filters collapsed using either a Di-Methyl Formamide (DMF) or acetone atmosphere (AA) technique (describe technique)? <i>The use of an acetone vaporizer ("hot block") is not advised due to the formation of wind rows and tilted fibers.</i>	NA	NA	
6.7.2 Is plasma etching performed on collapsed MCE filters?	NA	NA	
6.7.2.1 Is a 5 to 10% layer of the collapsed surface removed during etching?	NA	NA	
6.7.3 Are collapsed MCE filters and secured polycarbonate filters transferred to a vacuum evaporator for carbon coating?	NA	NA	
6.7.4 Are excised filter sections placed on the appropriately labeled TEM grids and cleared using a Jaffe Washer or an equivalent technique (describe)?	NA	NA	
6.7.5 Are samples checked for remaining filter residue after clearing?	NA	NA	
6.7.5.1 If residue remains, is condensation washing or an equivalent technique used (describe technique)?	NA	NA	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.8 Indirect Sample Preparation of Air and Dust Samples			
6.8.1 Are the applicable Libby guidance documents available for reference:			
6.8.1.1 SOP EPA-Libby-08 – Indirect Preparation of Air and Dust Sample for TEM Analysis?	NA	NA	
6.8.2 Sample filtration:			
6.8.3 Are the applicable SAP Analytical Summaries reviewed to determine the whether or not filter samples must be ashed?	NA	NA	
6.8.3.1 Are cassettes examined for loose material?	NA	NA	
6.8.3.1.1 If loose material or uneven loading is not evident, is a portion of the air samples retained?	NA	NA	
6.8.3.1.2 If loose material is evident, is the loose material filtered along with the air filter?	NA	NA	
6.8.3.2 Ashing (if applicable):			
6.8.3.2.1 Are filters covered with aluminum foil and placed in a plasma asher?	NA	NA	
6.8.3.2.2 Is the plasma asher operated at minimum power?	NA	NA	
6.8.3.2.3 Is 100% ashing confirmed by visual observation?	NA	NA	
6.8.3.3 Are air filters, loose material, dust, or ash, rinsed into a beaker and brought to a final volume of 100 mL with particle-free water?	NA	NA	
6.8.3.3.1 Adjusted to a pH of 3-4 with a 10% solution of glacial acetic acid?	NA	NA	
6.8.3.3.2 Sonicated for 3 minutes and allowed to settle for 2 minutes prior to filtering?	NA	NA	
6.8.3.4 Are the appropriate aliquots of filtrate passed through a <u>disposable</u> 25 mm filter assembly with a 0.2 µm MCE filter with a 5.0 µm MCE support pad?	NA	NA	
6.8.4 Are serial dilutions performed as necessary?	NA	NA	
6.8.5 Are TEM grids prepared as described in Section 6.7 of this checklist?	NA	NA	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.9 Water Sample Preparation			
6.9.1 What method(s) does the laboratory use to prepare water samples for TEM analysis:			
6.9.1.1 EPA Method 100.2 - Determination of Asbestos Structures Over 10 µm in Length in Drinking Water?	NA	NA	
6.9.1.2 EPA Method 100.1 - Determination of Asbestos Fibers Drinking Water?	NA	NA	
6.9.1.3 Others (describe)? _____	NA	NA	
6.9.2 Are samples received and filtered by the laboratory within 48 hours of collection?	NA	NA	
6.9.2.1 If not, are they stored in a refrigerator until filtered?	NA	NA	
6.9.3 Laboratory Modification LB-000020A:			
6.9.3.1 Do samples undergo treatment with ozone/UV light?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6.9.3.2 Are samples hand-agitated and sonicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<i>Refer to Section 6.2 of EPA Method 100.1</i>			Ozone/UV light equipment are not available, and samples would need to be treated and filtered in Libby, MT.
6.9.4 Are the appropriate aliquots of the original sample poured through a 25 mm or 47 mm MCE filter (0.22 µm or smaller pore size) with an MCE filter (5 µm pore size) backing pad?	NA	NA	
Note: No less than 1 mL must be used as an aliquot.			
6.9.5 Are TEM grids prepared as described in Section 6.7 of this checklist?	NA	NA	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.10 OU3 Tree Bark Sample Preparation			
6.10.1 Are the applicable Libby guidance documents available for reference:			
6.10.1.1 EPA-Libby-2012-12 – Sampling and Analysis of Tree Bark for Asbestos?	NA	NA	
6.10.2 Drying and Ashing:			
6.10.2.1 Are the diameter and thickness of the tree bark samples measured and recorded to an accuracy of ± 2 mm?	NA	NA	
6.10.2.2 Is the entire tree bark sample weighed and placed in an oven for drying?	NA	NA	
6.10.2.2.1 Dried at 80° C until the weight stabilizes, a minimum of 6 hours, and weighed?	NA	NA	
6.10.2.3 Is the bark sample then covered and placed in a muffle furnace at 450° C for 18 hours, or until all organic matter has been removed, and weighed?	NA	NA	
6.10.2.3.1 Is the furnace ramped from 0° F to 450° C?	NA	NA	
6.10.3 Acid Treatment:			
6.10.3.1 After adding approximately 1-2 mL of DI water, is 10-20 of concentrated HCL added until no further reaction is visible (approx. 3-5 minutes)?	NA	NA	
6.10.3.2 Are samples diluted, transferred to a 100 mL container (with lid) and brought to a final volume of 100 mL with fiber-free DI water?	NA	NA	
6.10.3.3 Are samples capped, inverted 5-6 times, and sonicated for 2 minutes in preparation for filtering?	NA	NA	
6.10.4 Filtration:			
6.10.4.1 Are 5-20 mLs of solution transferred to a second container and brought to a volume of 100 mL with fiber-free DI water?	NA	NA	
6.10.4.2 Are dilutions agitated (inverted 5-6 times) and filtered through a 47 mm MCE filter (0.45 μ m pore size)?	NA	NA	
6.10.4.2.1 Are additional dilutions prepared if the loading on the filter appears either too heavy (> 20%) or too light?	NA	NA	
6.10.5 Are TEM grids prepared as described in Section 6.7 of this checklist?	NA	NA	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.11 OU3 Duff Sample Preparation			
6.11.1 Are the applicable Libby guidance documents available for reference:			
6.11.1.1 EPA-Libby-2012-11 – Sampling and Analysis of Duff for Asbestos?	NA	NA	
6.11.2 Drying and Ashing:			
6.11.2.1 Are the appropriate number of aluminum trays weighed and tared?	NA	NA	
6.11.2.1.1 For tracking purposes, is each tray marked with a unique number?	NA	NA	
6.11.2.2 Are trays filled to approximately ¾, dried at 60° C until the weight stabilizes a minimum of 10 hours, and weighed?	NA	NA	
6.11.2.3 Are dried duff samples transferred to covered pans and placed in a muffle furnace at 450° C for 18 hours, or until all organic matter has been removed, and weighed?	NA	NA	
6.11.2.4 Are ashed samples transferred to Zip-lock bags and homogenized?	NA	NA	
6.11.2.4.1 If an individual sample was split between multiple trays, was it combined into one Zip-lock bag?	NA	NA	
6.11.3 Acid Treatment:			
6.11.3.1 After adding approximately 1-2 mL of DI water to 0.25 grams (measured to ± 0.01 g) of ashed sample, is 10-20 mL of concentrated HCL added until no further reaction is visible (approx. 3-5 minutes)?	NA	NA	
6.11.3.2 Are samples diluted, transferred to a 100 mL container (with lid) and brought to a final volume of 100 mL with fiber-free DI water?	NA	NA	
6.11.3.3 Are sample capped, inverted 5-6 times, and sonicated for 2 minutes in preparation for filtering?	NA	NA	
6.11.4 Filtration:			
6.11.4.1 Is 0.1 to 1.0 mL of solution transferred to a second container and brought to a volume of 100 mL with fiber-free DI water?	NA	NA	
6.11.4.2 Are dilutions agitated (inverted 5-6 times) and filtered through a 47 mm MCE filter (0.45 µm pore size)?	NA	NA	
6.11.4.2.1 Are additional dilutions prepared if the loading on the filter appears either too heavy (> 20%) or too light?	NA	NA	
6.11.5 Are TEM grids prepared as described in Section 6.7 of this checklist?	NA	NA	
Additional Comments:			

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6.0 TRANSMISSION ELECTRON MICROSCOPY (TEM) GRID PREPARATION	Yes	No	Comments
6.12 Grid Preparation/filtrate Storage			
6.12.1 For indirect preparations, are remaining filtrates filtered onto the appropriate filter(s) to be archived?	NA	NA	
6.12.2 Are all remaining filters and filter portions labeled prior to archiving?	NA	NA	
6.12.3 Are grids stored in marked grid storage boxes or other suitable containers and stored in a dust/fiber free environment?	NA	NA	
6.12.4 Is the location of grid preparation recorded in such a manner that they can be retrieved upon request in a timely manner?	NA	NA	
6.13 Quality Control Samples			
6.13.1 Are quality control samples prepared at the described frequency:			
6.13.1.1 Are laboratory blanks (LB) prepared at a frequency of 4% or with each preparation batch, whichever is more frequent?	NA	NA	
6.13.1.2 Are re-preparations prepared at a frequency of 1%?	NA	NA	
6.14 Standard Operating Procedures (SOPs)			
6.14.1 Are the applicable laboratory SOPs available and followed by laboratory personnel (list)?	NA	NA	
Document Title	Control No.	Description	
6.15 Document Control	Yes	No	Comments
6.15.1 Are all logbooks, notebooks, forms, or other laboratory documents legible, accurate, and complete (list)?	NA	NA	
Document Title	Description/Comments		
Additional Comments:			

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7.0 TEM ANALYSIS		Yes	No	Comments
7.1 Are TEM areas adequate, clean, and orderly?		NA	NA	
7.2 Are steps taken to prevent the cross-contamination of equipment, supplies, and reagents?		NA	NA	
Personnel Interviewed				
Name	Title	Experience		
7.3 Methods and Guidance Documents		Yes	No	Comments
7.3.1 What method(s) does the laboratory use to analyze samples TEM:				
7.3.1.1	40 CFR, Chapter 1, Part 763, Subpart E (AHERA)?	NA	NA	
7.3.1.2	ISO 10312:1995 E - Determination of Asbestos Fibers?	NA	NA	
7.3.1.3	ASTM D 5755-09 - Microvacuum Sampling and Indirect Analysis of Dust by TEM?	NA	NA	
7.3.1.4	EPA Method 100.2 - Determination of Asbestos Structures Over 10 µm in Length in Drinking Water?	NA	NA	
7.3.1.5	Others (list)? _____	NA	NA	
7.3.2 Are project-specific requirements communicated to laboratory personnel and available for reference:				
7.3.2.1	Laboratory Modifications?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Available in the eRoom where all applicable Hygeia personnel have access.
7.3.2.2	Project-specific SOPs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.2.3	SAP Analytical Summaries?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.2.4	Project-specific Electronic Data Deliverables (EDDs)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7.3.2.5	Other (list)? _____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7.4 TEM Instrumentation				
7.4.1 Does TEM instrumentation meet the following requirements:				
7.4.1.1	Capable of being operated at between 80 and 120 kV?	NA	NA	
7.4.1.2	Electron diffraction (ED) and energy dispersive X-ray (EDX) capabilities?	NA	NA	
7.4.1.3	Fluorescent screen with an inscribed or overlaid calibrated scale?	NA	NA	
7.4.2 Are the instruments equipped with thin film or beryllium windows (list below if necessary)? <u>Beryllium</u>		NA	NA	
7.4.3 Are all routine and non-routine maintenance activities recorded in instrument-specific logbooks?		NA	NA	
Instrument No.	Make	Model	Capabilities	
N/A	Hitachi	H-600	Beryllium	
Additional Comments:				

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7.0 TEM ANALYSIS	Yes	No	Comments
7.5 Instrument Calibration (Laboratory Modification LB-00085A)			
7.5.1 Is microscope alignment performed <u>daily</u> :			
7.5.1.1 Centering of electron beam?	NA	NA	
7.5.1.2 Electron beam is properly stigmated on either side of crossover?	NA	NA	
7.5.1.3 Image properly focused?	NA	NA	
7.5.2 Is the TEM screen magnification calibrated <u>monthly</u> ?	NA	NA	
7.5.3 Is the camera constant calibrated <u>monthly</u> ?	NA	NA	
7.5.4 Is the spot size diameter determined to be less than 250 nm <u>quarterly</u> ?	NA	NA	
7.5.5 Is the low beam dose (≥ 15 seconds for Chrysotile) verified <u>quarterly</u> ?	NA	NA	
7.5.6 EDXA System:			
7.5.6.1 Is X-ray energy versus channel for two peaks (i.e., Cu/Al) checked <u>daily</u> ?	NA	NA	
7.5.6.2 Is detector resolution (Mn) checked <u>quarterly</u> ?	NA	NA	
7.5.6.3 Are K-factors relative to Si determined for Na, Mg, Al, Ca, and Fe <u>quarterly</u> ?	NA	NA	
7.5.7 Are instrument calibration records maintained in instrument-specific logbooks?	NA	NA	
7.6 Reference Materials			
7.6.1 Does the laboratory maintain a library of reference materials on asbestos and other fiber types?	NA	NA	
7.6.2 Are instrument-specific "LA" spectra available, posted near the TEM?	NA	NA	
7.7 Grid Acceptance/Rejection Criteria			
7.7.1 Grid preparation rejection criteria:			
7.7.1.1 The replica is too dark due to poor dissolution?	NA	NA	
7.7.1.2 Replica is doubled or folded?	NA	NA	
7.7.1.3 Replica has > 25% obscuration rejected?	NA	NA	
7.7.1.4 Replica has < 50 intact grid openings?	NA	NA	
<i>Refer to Request for Modifications LB-000016H and LB-000031G</i>			
7.7.2 Are samples associated with grids determined to be overloaded (>25%) re-prepped using the indirect-transfer technique described in SOP EPA-Libby-08?	NA	NA	
Additional Comments:			

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7.0 TEM ANALYSIS	Yes	No	Comments
7.8 Modifications to AHERA & ASTM D5755:			
7.8.1 Laboratory Modification LB-000031G:			
7.8.1.1 Are structures classified as fibers (F), bundles (B), clusters (C) or matrices (M)?	NA	NA	
7.8.1.2 Are the actual lengths and widths of fibers, bundles, clusters and matrices (M) recorded?	NA	NA	
7.8.1.3 For disperse matrices and clusters, is the length of the longest protruding structure recorded?	NA	NA	
7.8.1.4 Unless identified as a "close call" (LB-000066D), are NAMs not recorded?	NA	NA	
7.8.1.5 Is the designation "ND" used to document when no structures are detected in a grid opening?	NA	NA	
7.8.1.6 Are fibers, bundles, clusters and matrices only recorded they contain individual constituent fibers meeting the aspect ratio criterion?	NA	NA	
7.8.1.7 Are non-countable recorded, but not counted, for informational purposes?	NA	NA	
7.8.1.8 Is the entire length recorded for structures originating in one grid opening and extending to an adjacent grid opening?	NA	NA	
7.8.2 Laboratory Modification LB-000067:			
7.8.2.1 Are the structure identification codes described in Tables D.1 and D.2 of ISO Method 10312 used?	NA	NA	
7.9 Modifications to EPA Method 100.2:			
7.9.1 Laboratory Modification LB-000020:			
7.9.1.1 Are all applicable analyte structures, including those comprising the LA complex, $\geq 0.5 \mu$ in length with a \geq AR recorded?	NA	NA	
7.9.1.2 Are a maximum of 10 grid openings counted?	NA	NA	
7.9.2 Laboratory Modification LB-000067:			
7.9.2.1 Are the structure identification codes described in Tables D.1 and D.2 of ISO Method 10312 used?	NA	NA	
Additional Comments:			

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7.0 TEM ANALYSIS	Yes	No	Comments
7.10 Modifications to ISO Method 10312:			
7.10.1 Laboratory Modification LB-000016H:			
7.10.1.1 Unless identified as a "close call" (LB-000066D), are NAMs recorded?	NA	NA	
7.10.1.2 Are bundles only recorded if they contain individual constituent fibers meeting the aspect ratio criterion?	NA	NA	
7.10.1.3 Are bundles, compact clusters, and compact matrices counted regardless of aspect ratio?	NA	NA	
7.10.1.4 Are structures that intersect non-countable grid bars recorded for informational purposes?	NA	NA	
7.10.1.5 Are component structures, which do not intersect non-countable grid bars, but are within non-countable structures counted?	NA	NA	
7.10.1.6 Is the entire length recorded for structures originating in one grid opening and extending to an adjacent grid opening?	NA	NA	
7.10.1.7 For structures which intersect more than one grid bar is the observed length of the structure recorded?	NA	NA	
7.10.1.8 Are the recorded rules for partially obscured structures properly applied (i.e., MFO and MBO)?	NA	NA	
7.10.1.9 Are the counting and recording rules for the identification of PCMe structures at "low magnification" applied?	NA	NA	
7.11 Common TEM Modifications:			
7.11.1 Laboratory Modification LB-000030:			
7.11.1.1 Are highly detailed sketches of up to 50 asbestos structures provided?	NA	NA	
7.11.2 Laboratory Modification LB-000066D:			
7.11.2.1 Is the presence or absence of sodium and potassium recorded for all LA, OA and NAM particles (NaK, NaX, XK or XX)?	NA	NA	
7.11.2.2 Is probable mineral identification code recorded for all particles?	NA	NA	
7.11.2.2.1 Are LA particles identified as WRTA, AC, TR or AT?	NA	NA	
7.11.2.2.2 Are OA particles identified as AM, AN or CR?	NA	NA	
7.11.2.2.3 Are NAMs indicated as PY, OT or UN?	NA	NA	
7.11.2.3 Is one SAED pattern recorded for each amphibole asbestos type encountered per samples?	NA	NA	
7.11.2.4 Are EDS spectrum (a maximum of 5) collected for up to 5 LA and 5 Close-call NAM per sample?	NA	NA	
Additional Comments:			

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7.0 TEM ANALYSIS		Yes	No	Comments
7.12 Counting/stopping rules:				
7.12.1 Are the Analytical Summaries reviewed to determine the following:				
7.12.1.1 Analytical Sensitivity?		NA	NA	
7.12.1.2 Recording rules (i.e., AR)?		NA	NA	
7.12.1.3 Stopping rules (i.e., abundant CH)?		NA	NA	
7.12.1.4 Applicable Laboratory Modifications?		NA	NA	
7.12.1.5 Investigative or non-investigative?		NA	NA	
7.13 Quality Control Analyses (Laboratory Modification LB-000029C)				
7.13.1 Are quality control samples analyzed at the required frequencies:				
7.13.1.1 Laboratory blanks – Frequency 4%?		NA	NA	
7.13.1.2 Recount Same (RS) - Frequency of 1%?		NA	NA	
7.13.1.3 Recount Different (RD) - Frequency of 2.5%?		NA	NA	
7.13.1.4 Inter-laboratory - Frequency of 0.5%?		NA	NA	
7.13.1.5 Verified Analysis (VA) - Frequency of 1%?		NA	NA	
7.13.1.6 Re-preparations – Frequency of 1%		NA	NA	
7.13.2 Are samples selected for RS, RD and VA analyses in accordance with Laboratory Modification LB-000029C?		NA	NA	
7.13.3 Is the procedure used to evaluate QC sample analyses in accordance with Laboratory Modification LB-000029C?		NA	NA	
7.14 Standard Operating Procedures (SOPs)				
7.14.1 Are the applicable laboratory SOPs available and followed by laboratory personnel (list)?		NA	NA	
Document Title	Control No.	Description		
TEM QAM				
7.15 Document Control		Yes	No	Comments
7.15.1 Are all logbooks, notebooks, forms, or other laboratory documents legible, accurate, and complete (list)?		NA	NA	
Document Title	Description/Comments			
Additional Comments:				

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)		Yes	No	Comments
8.1 Are PLM areas adequate, clean, and orderly?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.2 Are steps taken to prevent the cross-contamination of equipment, supplies, and reagents?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Personnel Interviewed				
Name	Title	Experience		
Arturo Casas	Laboratory Manager/PLM Analyst	33 Years		
8.3 Methods and Guidance Documents		Yes	No	Comments
8.3.1 Are the applicable guidance documents available for reference:				
8.3.1.1 EPA SOP SRC-Libby-01?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.3.1.2 EPA SOP SRC-Libby-03?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.3.1.3 NIOSH 9002, Issue 2 - Asbestos (Bulk) by PLM?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.3.1.4 Others (list)?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8.3.2 Are project-specific requirements communicated to laboratory personnel and available for reference:				
8.3.2.1 Laboratory Modifications?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Available in the eRoom where all applicable Hygeia personnel have access.
8.3.2.2 Project-specific SOPs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.3.2.3 SAP Analytical Summaries?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.3.2.4 Project-specific Electronic Data Deliverables (EDDs)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.3.2.5 Other (list)?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8.4 Equipment				
8.4.1 Ventilation Hoods:				
8.4.1.1 Checked routinely and recorded in a permanent logbook?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.4.2 Drying oven (optional):				
8.4.2.1 Checked routinely and recorded in a permanent logbook?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Muffle furnace calibrated to low temperature.
8.4.3 Muffle furnace:				
8.4.3.1 Checked routinely and recorded in a permanent logbook?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:				

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)		Yes	No	Comments
8.4.4 Analytical balances:				
8.4.4.1 Two balances:				
8.4.4.1.1 Accurate to 0.01 g, range of 0.01 to 1000 g?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.4.4.1.2 Accurate to 1 mg?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.4.4.2 Checked routinely and recorded in a permanent logbook?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.4.4.3 Calibrated within the last 12 months by a certified technician?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.5 Stereomicroscope				
8.5.1 Do stereomicroscopes meet the following requirements:				
8.5.1.1 Magnification range of 10X to 50X?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.5.1.2 Incandescent or fluorescent light source?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6 Polarized Light Microscope				
8.6.1 Are PLMs equipped with the following:				
8.6.1.1 Light source and replacement bulbs?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.2 Binocular observation tube?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.3 Blue daylight filter?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.4 Oculars (10X)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.5 Objectives: 10X, 20X and 40X (or similar)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.6 10X dispersion staining objective?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.7 A 360 degree graduated rotating stage?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.8 Polarizer and analyzer aligned at 90 degrees to one another?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.9 Bertrand lens?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.10 Substage condenser with iris diaphragm?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.11 Accessory slot for compensator plate?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.12 First order red (550 nanometer) compensator plate?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.13 Crosshair reticle?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.1.14 Adjustment tools?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.6.2 Are microscopes well-maintained, and are all routine and non-routine maintenance activities recorded in instrument-specific logbooks?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Instrument No.	Make	Model	Capabilities	
Station 1	Olympus	BH-2		
Station 2	Nikon	Labophot		
Additional Comments:				
Eight PLMs are available, but only the two listed are currently used.				

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.7 Refractive Index Liquids			
8.7.1 What refractive index liquids are available:			
8.7.1.1 High dispersion RI liquids from 1.620 to 1.640?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1.625
8.7.1.2 1.550 high dispersion RI liquid?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.7.1.3 1.680 to 1.700 RI liquids?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.7.2 Are refractive index liquids checked daily for contamination?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Fiber glass is used to check RIs, tools, etc.
8.7.3 Are refractive index (RI) liquids calibrated monthly using a refractometer or other means (describe)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8 Reference Materials			
8.8.1 Does the laboratory maintain a library of asbestos and non-asbestos reference materials:			
8.8.1.1 NIST SRM 1866b (Ch, Am and Cr)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.2 NIST SRM 1867a (Tr, Ac, and An)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.3 USGS LA PEs:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.3.1 LA 0.2% by mass?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.3.2 LA 1.0% by mass?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.3.3 Other (List)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2% LA.
8.8.1.4 Controlled LA asbestos (USGS)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.5 NIST testing round M12001 (winchite/richterite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.8.1.6 Non-asbestos (i.e., gypsum, calcite, and fiberglass)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9 PLM Calibration	Yes	No	Comments
8.9.1 Is PLM alignment performed daily:			
8.9.1.1 Alignment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.1.2 Stage and objectives centered?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.1.3 Optic axis centered?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.1.4 Alignment of the upper/lower polars?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.1.5 Centered through substage condenser and iris diaphragm?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.9.2 Microscope adjustments verified and recorded prior to sample analyses?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.10 PLM Analysis by NIOSH Method 9002:			
8.10.1 Does the laboratory perform PLM analyses on samples received from the Libby Superfund site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>If answered "No" precede to Section 8.11 of the checklist.</i>			
8.10.2 Are samples visually examined by stereomicroscope for the following:			
8.10.2.1 Color?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.2.2 Homogeneity?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.2.3 Texture?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3 Which of the following techniques are used to prepare samples for analysis:			
8.10.3.1 Mortar & pestle?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3.2 Acid washing?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3.3 Ashing?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3.4 Solvents?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.3.5 Other (list)?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.4 For non-friable, organically bound samples requiring ashing and/or acid reduction, are all necessary weights and tare weights measured and recorded?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5 Are slides prepared using the appropriate refractive index liquid(s) and scanned for asbestos fibers using the following optical properties:			
8.10.5.1 Morphology?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.2 Color?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.3 Refractive indices?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.4 Pleochroism?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.5 Birefringence?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.6 Extinction characteristics?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.7 Sign of elongation?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.5.8 Dispersion staining characteristics?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.6 Are the observed optical properties compared to Table 1 (Optical Properties of Asbestos Fibers) to determine the asbestos mineral present?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.7 Is a quantitative assessment of asbestos content made from both the gross and microscopic examinations?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.8 If no fibers are detected in a homogeneous samples are at least two additional slides prepared and analyzed prior to concluding no asbestos is present?	<input type="checkbox"/>	<input type="checkbox"/>	
8.10.9 Is at least one optical property recorded for fibers determined to be non-asbestos fibers?	<input type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.11 PLM-VE (SOP SRC-Libby-03)			
8.11.1 Stereomicroscopic Examination:			
8.11.1.1 Are all sample preparation activities performed within a HEPA-filtered hood?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.2 Is the entire sample transferred to an asbestos-free substrate for examination?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.3 Is the entire sample examined for homogeneity and the presence of suspect fibers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	A petri dish is used.
8.11.1.4 Are suspect fibers removed with fine forceps and mounted in the appropriate RI liquid for PLM analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.5 Are the stereomicroscopic findings recorded:			
8.11.1.5.1 Sample appearance?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.5.2 Estimated percentage of LA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.1.5.3 Estimated percentage of other asbestos types?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.2 Determination of Ashing the Sample:			
8.11.2.1 Are soil sample containing a significant amount of artifacts ashed prior to being prepared for random PLM mounts?	NA	NA	
8.11.2.1.1 Are samples ashed in a muffle furnace at approximately 480°C?	NA	NA	None observed to-date.
8.11.2.1.2 Are the necessary gravimetric measurements recorded for the determination of "Pre-ash percent asbestos"?	NA	NA	
8.11.3 Slide Preparation for PLM-VE:			
8.11.3.1 Are a minimum of five random sub-samples mounted in the appropriate RI liquid (1.620-1.640) for measurement of LA optical properties?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.4 Supplemental Stereomicroscopic Evaluation:			
8.11.4.1 Following the random slide mount preparation, is the container agitated to cause the particulate to settle and asbestos fibers sort to the surface?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.4.2 Is the sample re-examined and the fiber pick procedure repeated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.11.5 Classification of Asbestos Mineral Type:			
8.11.5.1 Using PLM is entire area of each prepared slide examined for asbestos, non-asbestos and matrix material?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2 Is positive identification determined from the following six optical properties:			Refer to finding No. 2 in the Audit Report.
8.11.5.2.1 Habit?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8.11.5.2.2 Color & pleochroism (if present)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2.3 Both alpha and gamma Refractive indices?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2.4 Birefringence?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2.5 Extinction angle?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.2.6 Sign of elongation (positive-slow or negative fast)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.3 Based on the optical properties, is asbestos classified into one of three categories:			
8.11.5.3.1 Libby Amphibole (LA)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.3.2 Other Amphibole (OA)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.3.3 Chrysotile (CH)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.5.4 Is at least one optical property recorded for observed non-asbestos fibers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.6 Quantification of Asbestos Content:			
8.11.6.1 Is asbestos reported as either mass or area percent for LA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.6.2 Are other, non-LA, asbestos types reported in area percent?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refer to finding No. 2 in the Audit Report.
8.11.6.3 Are reference materials used to aid in visual estimation:			Prepares fresh reference slides, as necessary.
8.11.6.3.1 LA PE reference materials (0.2% or 1.0%)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.6.3.2 Are visual estimates of greater than 1% LA performed using calibration standards made in-house from NIST SRMs and NIST PEs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.7 Are calibrated visual estimates determined from both the detailed stereomicroscopic observations and examination of the total area for all five random slide mounts?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.8 Are LA results reported in the appropriate bin categories:			
8.11.8.1 Non-detects recorded as Bin A?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.8.2 Less than 0.2% LA recorded as Bin B1?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.8.3 Greater than 0.2%, but less than 1% recorded as Bin B2?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.11.8.4 Equal to or greater than 1% recorded as Bin C, with the percentage recorded as a whole number?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)	Yes	No	Comments
8.12 PLM-GRAV (SOP SRC-Libby-01)			
8.12.1 Stereomicroscopic Examination:			
8.12.2 Is the entire sample weighed and placed in an appropriate container?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.3 Does the stereomicroscopic examination include:			
8.12.3.1 Examination of multiple fields of view over the entire sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.3.2 Probing of the sample and breaking clumps where possible?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.3.3 Manipulation of the sample with the appropriate tools?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.3.4 Observation homogeneity, texture, friability, color and extent of any asbestos content?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.4 Does the analyst refrain from segregating and weighing particles smaller than 2 - 3 mm (1/10 inch)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.5 If no particles larger than 2 – 3 mm or larger are present, are one of the following recorded:			
8.12.5.1 No asbestos detected (ND)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.5.2 Trace levels of asbestos observed, but not quantified (Tr)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.6 Examination by PLM:			
8.12.7 Are tentatively identified asbestos particles examined by PLM as described in SOP SRC-Libby-03 (Section 8.12 of this checklist)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.8 If asbestos particles are determined to be OA, are they further characterized:			
8.12.8.1 Amosite (AMOS)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.8.2 Anthophyllite (ANTH)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.8.3 Crocidolite (CROC)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.8.4 Unknown (UNK)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.9 Is the total weight of each type of positively identified asbestos measured and recorded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.12.10 Record Keeping:			
8.12.11 Is the data log sheet provided in Attachment 1 of the SOP used to record weights the initial (coarse fraction) and segregated asbestos?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments:			

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8.0 POLARIZED LIGHT MICROSCOPY (PLM)		Yes	No	Comments
8.13 Quality Control Analyses				
8.13.1 Are the following types of QC analyses performed at the required frequencies:				Each analyst also analyzes four SRMs per month.
8.13.1.1 Laboratory duplicate self-check (LDS) at a frequency of 2%?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Refer to Finding No. 1 in the Audit Report.
8.13.1.2 Laboratory duplicate cross-check (LDC) at a frequency of 8%?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8.13.2 For sample containing LA, are LDS and LDC analyses considered acceptable if:				
8.13.2.1 For LA results, within 1 Bin category?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.13.2.2 For LA results, %LA ≤1%?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Note: For LA results greater than 1%, the laboratory should refer to their internal QA/QC system.				
8.13.3 Is the appropriate correction action taken when LDC or LDS analyses do not meet acceptance criteria (describe)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8.14 Standard Operating Procedures (SOPs)				
8.14.1 Are the applicable laboratory SOPs available and followed by laboratory personnel (list)?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Refer to Finding Nos. 1 and 2 in the Audit Report.
Document Title	Control No.	Description		
SRC-LIBBY-01	Revision 3			
SRC-LIBBY-03	Revision 3			
8.15 Document Control		Yes	No	Comments
8.15.1 Are all logbooks, notebooks, forms, or other laboratory documents legible, accurate, and complete (list)?		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Document Title	Description/Comments			
PLM Calibration & Contamination Log	PLM Calibration/Alignment			
Additional Comments:				

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9.0 DATA MANAGEMENT	PCM	TEM	PLM	Comments
9.1 Data Package Review and Assembly	Yes	Yes	Yes	
9.1.1 Are deliverables reviewed to ensure project-specific requirements are adhered to:				
9.1.1.1 Request for Modifications to Laboratory Activities?	NA	NA	NA	
9.1.1.2 Project-specific SOPs?	NA	NA	NA	
9.1.1.3 SAP Analytical Summaries?	NA	NA	NA	
9.1.1.4 Project-specific Electronic Data Deliverables (EDDs)?	NA	NA	NA	
9.1.1.5 Other (list)? _____	NA	NA	NA	
9.1.2 Are all deliverables reviewed for completeness and accuracy prior to being submitted:				
9.1.2.1 Hard copy deliverables?	NA	NA	NA	
9.1.2.2 Electronic deliverables?	NA	NA	NA	
9.1.3 Are all reviews documented?	NA	NA	NA	
9.2 Data Submission				
9.2.1 Is the submittal of electronic deliverables tracked and recorded:				
9.2.1.1 Date submitted?	NA	NA	NA	
9.2.1.2 Recipient?	NA	NA	NA	
9.2.2 Is the submittal of hard copy deliverables tracked and recorded:				
9.2.2.1 Date submitted?	NA	NA	NA	
9.2.2.2 Recipient?	NA	NA	NA	
9.3 Data Storage and Archiving				
9.2.3 Are electronic files archived onto suitable media on a frequent basis?	NA	NA	NA	
How often? <u>Weekly to tapes</u>				
9.2.4 Are all hardcopy data stored in a secured location with limited access (e.g., locking file cabinet)?	NA	NA	NA	
Additional Comments:				

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10.0 QUALITY ASSURANCE/QUALITY CONTROL	PCM	TEM	PLM	Comments
10.1 Laboratory Certifications	Yes	Yes	Yes	
10.1.1 Is the laboratory accredited for asbestos analysis under the National Voluntary Laboratory Accreditation Program (NVLAP):				
10.1.1.1 Asbestos Fiber Analysis (TEM Method)?	NA	<input checked="" type="checkbox"/>	NA	Expires 06/30/2014
10.1.1.2 Asbestos Fiber Analysis (PLM Method)?	NA	NA	<input checked="" type="checkbox"/>	Expires 06/30/2014.
10.1.2 Is the laboratory accredited for asbestos analysis under the American Industrial Hygiene Association (AIHA), and does it participate in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program?	NA	NA	NA	Expires 06/01/2015
10.2 Training				
10.2.1 Have all analysts undergone training on the proper usage of the equipment and instrumentation used in the respective areas?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.2.2 Have all analysts demonstrated proficiency through the preparation and/or analysis of standards or samples of known values?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.2.3 Are training records maintained in analyst-specific files?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.3 Internal Audits				
10.3.1 Are internal audits conducted on an annual basis using an appropriate checklist?	NA	NA	NA	
10.3.1.1 Are internal audit reports available for review?	NA	NA	NA	
10.4 Corrective/Preventive Action:				
10.4.1 Can the laboratory demonstrate the sequence of problem identification, corrective action, and resumption of duties?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.5 Quality Records				
10.5.1 Are SOPs available in the applicable areas for all laboratory-specific procedures?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.5.2 Does the laboratory have a Quality Assurance Manual/Plan?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.5.3 Does the laboratory compile monthly quality assurance/quality control reports?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.6 Environmental Controls/Laboratory Monitoring				
10.6.1 Does the laboratory conduct an environmental monitoring program?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.6.2 Is quarterly air monitoring performed in all laboratory areas?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10.6.2.1 Are the collected samples analyzed by TEM with a target analytical sensitivity of 0.005 structures/cc?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Air and wipe samples are collected to monitor for potential contamination.
10.6.2.2 If LA is detected, are the affected areas thoroughly cleaned and a new set of samples collected and analyzed?	NA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Laboratory Modification LB-000085A				
Additional Comments:				